

Patent claims

1. Process for the preparation of completely or partly saturated organic compounds by catalytic hydrogenation of unsaturated organic compounds with hydrogen or hydrogen-containing gas mixtures in the presence of a shaped Raney catalyst as the hydrogenation catalyst, characterized in that the Raney catalyst is in the form of hollow bodies.
2. Process according to claim 1, characterized in that the Raney catalysts in the form of hollow bodies comprise nickel, cobalt, copper, iron, platinum, palladium, ruthenium or mixtures of these metals as catalytically active constituents.
3. Process according to claim 1 or 2, characterized in that the Raney catalyst is in the form of hollow spheres.
4. Process according to claim 1 or 3, characterized in that the bulk density of the Raney catalysts used is in the range from 0.3 g/ml to 1.3 g/ml.
5. Process according to claim 1 or 4, characterized in that the catalyst shaped articles used have a diameter in the range from 0.05 to 20 mm.
6. Process according to one or more of claims 1 to 6, characterized in that the catalyst shaped articles used have a shell thickness in the range from 0.05 to 7 mm, preferably 0.1 mm to 5 mm.
7. Process according to one or more of claims 1 to 6, characterized in that the activated catalyst shaped articles used in the process comprise an inorganic binder.

10034939.061402
201410.061402

8. Process according to one or more of claims 1 to 6, characterized in that the activated catalyst shaped articles used in the process comprise no binder.
- 5 9. Process according to one or more of claims 1 to 8, characterized in that the Raney catalyst in the form of hollow bodies used is doped with one or more elements from groups 3B to 7B, 8 and 1B of the periodic table, in particular chromium, manganese, iron, vanadium, tantalum, titanium, tungsten, molybdenum, rhenium
- 10 10. Process according to one or more of claims 1 to 9, characterized in that the Raney catalyst in the form of hollow bodies used is doped with one or more elements from groups 1A, 2A, 2B and/or 3A of the periodic table and/or germanium, tin, lead, antimony or bismuth.
- 15 11. Process according to one or more of claims 1 to 10, characterized in that the hydrogenation is carried out in a fixed bed or suspension reactor in continuous operation.
- 20 12. Process according to one or more of claims 1 to 10, characterized in that the hydrogenation is carried out in the batch process.
13. Process according to one or more of claims 1 to 12, characterized in that cyclohexanes with 0 to 6 substituents from the series consisting of alkyl, cycloalkyl, aryl, alkenyl, alkinyl F, Cl, Br, I, NO₂, NH₂, NHalkyl, NHaryl, Nalkyl₂, Naryl₂, OH, HS, alkylS, arylS, S=C, alkyl-CO-O, aryl-CO-O, alkyl-SO, aryl-SO, alkyl-SO₂, aryl-SO₂, alkyl-SO₃, aryl-SO₃, CN, O=Calkyl, O=Caryl, HOOC, H₂NOC, alkylOOC, arylOOC, alkylO, Sialkyl₃, Sialkyl₂aryl, Sialkylaryl₂, cycloalkylO, arylO
- 30 are obtained as products.

10021939-061402

14. Process according to one or more of claims 1 to 12,
characterized in that saturated heterocyclic compounds
with 0 to 6 substituents from the series consisting of
alkyl, cycloalkyl, aryl, alkenyl, alkynyl F, Cl, Br,
5 I, NO₂, NH₂, NHalkyl, NHaryl, Nalkyl₂, Naryl₂, OH, HS,
alkylS, arylS, S=C, alkyl-CO-O, aryl-CO-O, alkyl-SO,
aryl-SO, alkyl-SO₂, aryl-SO₂, alkyl-SO₃, aryl-SO₃, CN,
O=Calkyl, O=Caryl, HOOC, H₂NOC, alkylOOC, arylOOC,
10 alkylO, Sialkyl₃, Sialkyl₂aryl, Sialkylaryl₂,
cycloalkylO, arylO are obtained as products.
15. Process according to one or more of claims 1 to 12,
characterized in that saturated organic compounds of
the general formula H₃C-(CH₂)_n-X are obtained as
products, wherein n is an integer between 1 and 30,
15 preferably between 4 and 25, and X is a functional
group from the series consisting of cycloalkyl, aryl,
F, Cl, Br, I, NO₂, NH₂, NHalkyl, NHaryl, Nalkyl₂, Naryl₂,
OH, HS, alkylS, arylS, S=C, alkyl-CO-O, aryl-CO-O,
alkyl-SO, aryl-SO, alkyl-SO₂, aryl-SO₂, alkyl-SO₃, aryl-
20 SO₃, CN, O=Calkyl, O=Caryl, HOOC, H₂NOC, alkylOOC,
arylOOC, alkylO, Sialkyl₃, Sialkyl₂aryl, Sialkylaryl₂,
cycloalkylO, arylO.
16. Process according to one or more of claims 1 to 12,
characterized in that mixtures of completely and/or
25 partly saturated fats, fatty acids, fatty nitriles,
fatty amines and/or fatty acid esters are obtained.
17. Process according to one or more of claims 1 to 12,
characterized in that the products are butanediol
or/and butenediol from the hydrogenation of butinediol.
- 30 18. Process according to one or more of claims 1 to 12,
characterized in that the products are butanediol
or/and butenediol from the hydrogenation of butinediol
in the presence of the shell-activated tablets of the
Raney type alloy.

201100 000100 000100

19. Process according to one or more of claims 1 to 12,
characterized in that the products are butanediol
or/and butenediol from the hydrogenation of butinediol
in the presence of the shell-activated tablets of the
Raney type alloy which is doped [sic] with one or
more elements from groups 3B to 7B, 8 and 1B of the
periodic table, in particular chromium, manganese,
iron, vanadium, tantalum, titanium, tungsten,
molybdenum, rhenium and/or metals of the platinum
group.
20. Process according to one or more of claims 1 to 12,
characterized in that the products are butanediol
or/and butenediol from the hydrogenation of butinediol
in the presence of the shell-activated tablets of the
Raney type alloy which is doped with one or more
elements from groups 1A, 2A, 2B and/or 3A of the
periodic table and/or germanium, tin, lead, antimony or
bismuth.
21. Process according to one or more of claims 1 to 12,
characterized in that the products are saturated rings
from the hydrogenation of aromatics.
22. Process according to one or more of claims 1 to 12,
characterized in that the products are saturated rings
from the hydrogenation of aromatics in the presence of
the shell-activated tablets of the Raney type alloy.
23. Process according to one or more of claims 1 to 12,
characterized in that the products are saturated rings
from the hydrogenation of aromatics in the presence of
the shell-activated tablets of the Raney type alloy
which is doped with one or more elements from groups 3B
to 7B, 8 and 1B of the periodic table, in particular
chromium, manganese, iron, vanadium, tantalum,
titanium, tungsten, molybdenum, rhenium and/or metals
of the platinum group.

24. Process according to one or more of claims 1 to 12,
characterized in that the products are saturated rings
from the hydrogenation of aromatics in the presence of
the shell-activated tablets of the Raney type alloy
which is doped with one or more elements from groups
1A, 2A, 2B and/or 3A of the periodic table and/or
germanium, tin, lead, antimony or bismuth.

10034989 061402
20041202 08:42:02